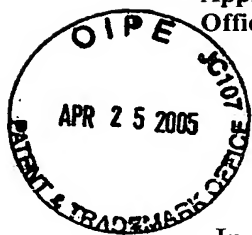


4-26-05

I Fee

DOCKET NO.: TIC-0052
Application No.: 10/722,723
Office Action Dated: January 28, 2005

PATENT



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Hiroshi Kuzuyama *et al.*

Confirmation No.: 7345

Application No.: 10/722,723

Group Art Unit: 3747

Filing Date: November 26, 2003

Examiner: **Huynh, Hai H.**

For: **Internal Combustion Engine and Control Device For The Internal Combustion Engine**

EXPRESS MAIL LABEL NO: EV 324569979 US
DATE OF DEPOSIT: April 25, 2005

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

REPLY PURSUANT TO 37 CFR § 1.111

In response to the Official Action dated **January 28, 2005**, reconsideration is respectfully requested in view of the amendments and/or remarks as indicated below:

- ☐ **Amendments to the Specification** begin on page of this paper.
- ☐ **Amendments to the Claims** are reflected in the listing of the claims which begins on page of this paper.
- ☐ **Amendments to the Drawings** begin on page of this paper and include an attached replacement sheet.
- ☒ **Remarks** begin on page 2 of this paper.

REMARKS

Claims 1-12 are pending in the application, and currently stand rejected under 35 U.S.C. § 102 as allegedly being anticipated by Morikawa *et al.* (U.S. Patent No. 6,422,200). Applicants respectfully disagree since the reference fails to teach or suggest all of the features recited in the claims.

Independent claim 1 recites, *inter alia*, “a time for closing the exhaust valve is set to be a timing on an advance side with respect to an intake top dead center, and the fuel injected from the fuel injection valve is pressurized together with residual gas inside the combustion chamber during a period in which both the intake valve and the exhaust valve remain closed.” As fully described in the specification on pages 4 and 5, ***the injected fuel must be injected prior to reaching the intake top dead center for the injected fuel to be pressurized together with residual gas inside the combustion chamber*** (i.e., the injected fuel is injected during the exhaust stroke):

The expression “on the advance side with respect to the intake to dead center” refers to a point in time earlier than the point in time at which the intake top dead center is reached by the piston. According to claim 1 of the invention, the closing of the exhaust valve is effected on the advance side with respect to the intake top dead center, and the intake valve and the exhaust valve are both brought into the closed state, so that, during the period from the closing of the exhaust valve to the reaching of the intake top dead center, the injected fuel is pressurized with the residual gas as the piston rises. In this pressurizing process, the fuel attains high temperature and high pressure to be modified, and becomes an ignition accelerator.

Page 4, lines 10-23.

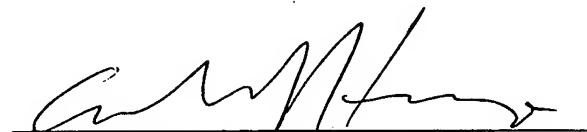
One way to accomplishing pressurizing the injected fuel together with the residual gas is by injecting fuel from the fuel injection valve immediately before the time for closing the exhaust valve—this “species” of claim 1 is recited in dependent claim 2. Another way to accomplish this is by injecting fuel from the fuel injection valve immediately after the time for closing the exhaust valve—this second species of claim 1 is recited in dependent claim 3. Thus, according to independent claim 1 and the claims depending therefrom, the injected fuel is injected during the exhaust stroke and prior to reaching the intake top dead center.

Although Morikawa discloses injecting fuel during a negative overlap period (where both the exhaust valve and the intake valve are closed), the reference teaches one of skill in that art that the fuel is injected on the intake stroke side of the negative overlap period. On the intake stroke side of the negative overlap period, *the pressure is gradually decreasing* (note that the pressure is still higher than atmospheric pressure). Even if the fuel is injected into the combustion chamber in this condition, the fuel cannot be modified because the temperature in the combustion chamber is not very high and the period until the intake valve opens is short.

Independent claims 8 and 12 each recite the concept of pressurizing fuel injected from a fuel injection valve together with residual gas inside the combustion chamber. To accomplish this, as discussed above, the fuel must be injected during the exhaust stroke side of a negative overlap period; that is, prior to reaching the intake top dead center. And Morikawa fails to teach or suggest this concept.

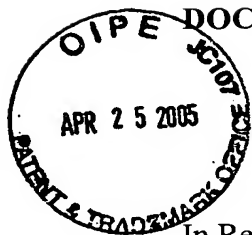
In view of the foregoing, Applicants respectfully submit that Morikawa does not anticipate the pending claims since the reference fails to disclose all of the features recited in each of independent claims 1, 8 and 12, and the claims depending therefrom. Applicants believe the claims accordingly are in condition for allowance and request confirmation of the same through issuance of a Notice of Allowability.

Date: April 25, 2005



Andrew J. Hagerty
Registration No. 44,141

Woodcock Washburn LLP
One Liberty Place - 46th Floor
Philadelphia PA 19103
Telephone: (215) 568-3100
Facsimile: (215) 568-3439



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EV324569979US

☒ MS Amendment ☐ MS AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

REPLY TRANSMITTAL LETTER

- ☐ A Preliminary Amendment.
- ☒ A Reply Responsive to the Office Action Dated January 28, 2005.
- ☐ A Reply Supplemental to the Paper filed
- ☐ A Substitute Specification (pages 1 -) in clean form.
- ☐ A substitute specification (pages 1 -) with markings.
- ☐ An Abstract is enclosed.
- ☐ replacement sheets of drawings are enclosed comprising figures
- ☐ Request is hereby made to accept black and white photograph(s) in this case, as they are the only practicable medium for illustrating the claimed invention. One (1) set of black and white photographs comprising figure(s) is submitted herewith.
- ☐ Petition is hereby made to accept drawing(s)/photograph(s) in this case.

- ☐ Three (3) sets of color drawing(s)/photograph(s) and black and white photocopy that accurately depicts to the extent possible, the subject matter shown in the color drawing(s)/photograph(s), are enclosed, comprising figures
- ☐ An amendment to the first paragraph in that portion of the Brief Description of the Drawings is also enclosed herewith advising that the patent contains at least one drawing/photograph in color.
- ☐ A Certified Copy of each of the following applications: is enclosed.
- ☐ An Associate Power of Attorney is enclosed.
- ☐ Information Disclosure Statement.
 - ☐ Attached Form 1449.
 - ☐ A copy of each reference as listed on the attached Form PTO-1449 is enclosed herewith.
- ☐ A Terminal Disclaimer is attached.
- ☐ Appendices as follows:
- ☐ Other
- ☒ **No Additional Fee is Due.**
- ☐ Applicant(s) has previously claimed small entity status under 37 CFR § 1.27.
- ☐ Applicant(s) by its/their undersigned attorney, claims small entity status under 37 CFR § 1.27 as
- ☐ This application is no longer entitled to small entity status. It is requested that this be noted in the files of the U.S. Patent and Trademark Office.

				SMALL ENTITY		NOT SMALL ENTITY	
	REMAINING AFTER AMENDMENT	HIGHEST PAID FOR	EXTRA	RATE	FEE	RATE	FEE
TOTAL CLAIMS	12	20 (20 MINIMUM)	0	\$25 EACH	\$	\$50 EACH	\$0
INDEP. CLAIMS	3	3 (3 MINIMUM)	0	\$100 EACH	\$	\$200 EACH	\$0
FIRST PRESENTATION OF MULTIPLE DEPENDENT				\$180	\$	\$360	\$0
<input type="checkbox"/> ONE MONTH EXTENSION OF TIME				\$60	\$	\$120	\$0
<input type="checkbox"/> TWO MONTH EXTENSION OF TIME				\$225	\$	\$450	\$0
<input type="checkbox"/> THREE MONTH EXTENSION OF TIME				\$510	\$	\$1020	\$0
<input type="checkbox"/> FOUR MONTH EXTENSION OF TIME				\$795	\$	\$1590	\$0
<input type="checkbox"/> FIVE MONTH EXTENSION OF TIME				\$1080	\$	\$2160	\$0
<input type="checkbox"/> LESS ANY EXTENSION FEE ALREADY PAID				minus	(\$)	minus	(\$0)
<input type="checkbox"/> TERMINAL DISCLAIMER				\$65	\$	\$130	\$0
<input type="checkbox"/> OTHER FEE OR SURCHARGE AS FOLLOWS:							
TOTAL FEE DUE					\$		\$0

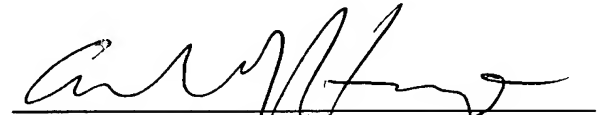
- ☐ A check in the amount of \$.00 is attached. Please charge any deficiency or credit any overpayment to Deposit Account 23-3050.
- ☐ Please charge Deposit Account No. 23-3050 in the amount of .00. This sheet is attached in duplicate.
- ☐ Petition is hereby made under 37 CFR § 1.136(a) (fees: 37 CFR § 1.17(a)(1)-(4)) to extend the time for response to the Office Action of _____ to and through _____ comprising an extension of the shortened statutory period of _____ month(s).

DOCKET NO.: TIC-0052

PATENT

- ☒ The Commissioner is hereby requested to grant an extension of time for the appropriate length of time, should one be necessary, in connection with this filing or any future filing submitted to the U.S. Patent and Trademark Office in the above-identified application during the pendency of this application. The Commissioner is further authorized to charge any fees related to any such extension of time to Deposit Account 23-3050. This sheet is provided in duplicate.

Date: April 25, 2005


Andrew J. Hagerty
Registration No. 44,141

Woodcock Washburn LLP
One Liberty Place - 46th Floor
Philadelphia PA 19103
Telephone: (215) 568-3100
Facsimile: (215) 568-3439

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